



BIOSPHERE COMPATIBILITY: HUMAN, REGION, TECHNOLOGIES

The founders

- Federal state budget educational institution of higher education
«Southwest State University»
- Federal state budget educational institution of higher education
«Orel State University named after I.S. Turgenev»
- Federal state budget educational institution of higher education
«Bryansk State Engineering and Technological University»
- Research institution of construction physics under the Russian academy
of architecture and construction sciences
- Federal state budget educational institution of higher education
«Moscow State University of Civil Engineering (National Research University)»
- Federal state budget educational institution of higher education
«Volgograd State Technical University»

Journal is included into the List of the Higher Examination Board of the Ministry of Education and Science of Russian Federation for the group of scientific specialties 05.23.00 – Building and architecture: 05.23.04, 05.23.08, 05.23.19, 05.23.21, 05.23.22

Editor-in-chief

V.A. Pyichev academician RAACS,
Doc. Sc. Tech., Prof.

Editor-in-chief assistants

S.G. Yemelyanov corresponding member of the RAACS,
Doc. Sc. Tech., Prof.

V.I. Kolchunov academician of the RAACS,
Doc. Sc. Tech., Prof.

Editorial committee

V.N. Azarov Doc. Sc. Tech., Prof.

E.M. Akimkin Candidate. Sc. Socail.

V.V. Aleksashina Doc. Arc., Prof.

I.A. Aseeva Doc. Sc. Phil., Prof.

N.V. Bakaeva Doc. Sc. Tech., associate professor

T. Bock Doc. Sc. Tech., Prof. (Germany)

H. Brandl Doc. Sc. Tech., Prof. (Austria)

V.V. Bredihin Doc. Sc. Econom., assoc. prof.

A.G. Bulgakov Doc. Sc. Tech., Prof.

A.A. Volkov Doc. Sc. Tech., Prof.,

corresponding member of the RAACS

V.A. Gordon Doc. Sc. Tech., Prof.

V.A. Egorushkin Cand. of agricultural sc., assoc. prof.

V.S. Yezhov Doc. Sc. Tech., Prof.

N.S. Kobelev Doc. Sc. Tech., Prof.

V.I. Ledenev Doc. Sc. Tech., Prof.

K.I. Liseev Doc. Sc. Filos., Prof.

V.V. Nedelin Prof.

V.I. Osipov academician of the RAS,

Doc. Sc. Tech., Prof.

O.V. Pilipenko Doc. Sc. Tech., Prof.

O.V. Sergeychuk Doc. Sc. Tech., Prof. (Ukraine)

V.I. Telichenko Doc. Sc. Tech., Prof.,

academician of the RAACS

V.V. Tur Doc. Sc. Tech., Prof. (Belarus)

V.S. Fyodorov Doc. Sc. Tech., Prof.,

academician of the RAACS

N.V. Fyodorova Doc. Sc. Tech., Prof.

E.M. Chernyshev Doc. Sc. Tech., Prof.,

academician of the RAACS

R. Shah Doc. Sc. Tech., Prof. (Germany)

I.L. Shubin corresponding member of the RAACS,

Doc. Sc. Tech., Prof.

Responsible for edition

A.G. Kolesnikov Candidat Sc. Tech, assoc. prof.

The edition address: 305040, Kursk,

str. 50 let Otyabrya, 94

+7 (4712) 22-24-61, www.swsu.ru

E-mail: biosfera_swsu@mail.ru

Journal is registered in Russian federal service for monitoring communications, information technology and mass communications

The certificate of registration: III № ФС77-56639

© Southwest State University, 2019

© Orel State University named after

I.S. TURGENEV, 2019

© Bryansk state engineering and technological university, 2019

© Research institution of construction physics under the

RAACS, 2019

© Moscow State University of Civil Engineering

(National research university), 2019

© Volgograd State Technical University, 2019

Contents

Questions of the theory of biospheric compatibility of the cities and settlements

Shubenkov M., Shubenkova M. Towards to the question of searching a balanced coexistence of natural and urbanized territories..... 3

Kholodova E.V. Garden arrangement in country houses of Kursk region. part III. Features gardens and parks in medium-sized and small estates in the late XVIII – first half XIX centuries..... 17

Danilina N. V. Urban planning education for sustainable development of smart cities..... 36

Varlamov A. A., Rimshin V. I. People. Information. Degradation..... 44

Belyaeva E. L. "Preservation" and "Ensuring preservation" in the design of improvement and greening of centers of historical cities..... 54

Biosphere technologies

Abdrakhimov V. Z. Waste recycling energy and non-ferrous metals in the production of ceramic bricks contributes to the ecological safety of the biosphere..... 71

Problems and programs of regions development

Leptiukhova O. Y., Utkina M. A. Methods of assessment the level of environmental and economic effect due to the using of low-speed individual vehicles, by the example of the town of Serpukhov..... 81

Ecological safety of construction engineering and municipal services

Pilipenko O.V., Abramov A.V., Skobeleva E.A., Pchelenok O.A. Development of research methods of urban soil temperature dynamics..... 91

The cities developing the person

Slepnev M.A., Filyakova E.I. Estimation of recreational load of Oryol city urban park «Kul'tury i otdykh»..... 101

Dear authors! 111

M. SHUBENKOV, M. SHUBENKOVA

TOWARDS TO THE QUESTION OF SEARCHING A BALANCED COEXISTENCE OF NATURAL AND URBANIZED TERRITORIES

The problems of modern urbanization of settlement areas associated with the deterioration of the ecological state of the human environment and the degradation of the natural environment are considered. Analyzes the most popular strategies of urbanization in modern socio-economic conditions. The article discusses the need to clarify the subject and object of modern urban development and their relationship with the issues of maintaining the development of natural habitats spreads. A comparison of the basic requirements for the development of natural and urban areas. The most popular concepts of solving the problems of interaction between natural and developed territories are analyzed. The concept of the description of States of interaction of separate territorial zones responsible for the main environmental characteristics of natural and urban environments is offered.

Keywords: natural environment, quasi-natural environment, living environment, balanced coexistence, urban zoning, interzonal interactions, zonal state.

E.V. KHOLODOVA

GARDEN ARRANGEMENT IN COUNTRY HOUSES OF KURSK REGION. Part III. FEATURES GARDENS AND PARKS IN MEDIUM-SIZED AND SMALL ESTATES IN THE LATE XVIII – FIRST HALF XIX CENTURIES

The study is based on the identified archival and printed sources, full-scale studies of the author, which allow more reasonably to reconstruct the figurative and material structure of the lost noble and merchant estates in the field of the origin of gardening and Park building in the Russian region.

The scientific novelty of the research is associated with the author's expeditions to identify signs of the existence of manor objects – landscapes and parks, full-scale inspection of a number of preserved manor complexes, which previously did not attract the attention of researchers.. Of particular importance is the identification of archival and printed sources that allow more reasonably reconstruct the figurative and material structure of the lost elements of noble and merchant estates.

The contribution to the modern knowledge is the systematized information about different types of management, their influence on the spatial structure of the estate and its natural environment, as well as the features of garden and Park techniques that existed in the studied period of the history of the Kursk region.

The study was carried out at the expense of the State program of the Russian Federation "Development of science and technology" for 2013-2020 in the framework of the Plan of fundamental research of the Ministry of construction of Russia and RAASN, topic 1.2.2.

Keywords: Kursk region (province), landscape, topography, estates, nature, gardens, parks, ponds, rivers, planning.

N. V. DANILINA

URBAN PLANNING EDUCATION FOR SUSTAINABLE DEVELOPMENT OF SMART CITIES

Modern urban planning educational trend defines the sustainable development of smart cities as one of the most dynamic areas of city policies around the world. A smart city is a high-tech urban living environment in which innovative solutions are embedded in its constituent elements and processes to improve its quality and living standards. The concept of a smart city is aimed at sustainable development of urban areas and offers technology as a tool for solving problems in the field of planning, design, integrated engineering landscaping, as well as in the provision of urban services to the population. The article discusses the contents of the smart city concept, which reflects the main directions of the curriculum of the master's program «Sustainable Smart City». Its main purpose is to prepare urban planners who have professional competencies in the development of smart cities in the implementation of urban processes.

Keywords: smart city, sustainable development, urban planning education, master`s educational program.

A. A. VARLAMOV, V. I. RIMSHIN

PEOPLE. INFORMATION. DEGRADATION

Considered the issues of interaction between man and nature. Noted that this interaction is fundamental in the existence of modern civilization. The question of possible impact on nature and society with the aim of preserving the existence of human civilization. It is shown that the study of this issue goes towards the creation of models of interaction between nature and man. Determining when building models is information about the interaction of man and nature. Considered information theory from the viewpoint of interaction between nature and man. Noted that currently information theory developed mainly as a mathematical theory. The issues of interaction of man and nature, the availability and existence of information in the material system is not studied. Indicates the link information with the energy terms control large flows of energy. For consideration of the interaction of man and nature proposed to use the theory of degradation. Graphs are presented of the information in the history of human development. Reviewed charts of population growth. As a prediction it is proposed to use the simplest based on the theory of degradation. Consideration of the behavior of these dependencies led to the conclusion about the existence of communication energy and information as a feature of the degradation of energy. It justifies the existence of border life (including humanity) at the point with maximum information. Shows the relationship of energy and time using potential energy.

Keywords: energy, time. potential of the energy, information, degradation of the object.

E. L. BELYAEVA

«PRESERVATION» AND «ENSURING PRESERVATION» IN THE DESIGN OF IMPROVEMENT AND GREENING OF CENTERS OF HISTORICAL CITIES

The urgency of the problem of comprehensive improvement and greening of the centers of historic cities has increased with the «May» decrees of the President of the Russian Federation V. V. Putin in 2018. However, the scientific foundations, methodology and design methodology of improvement does not take into account the peculiarities of historical cities, the need to preserve architectural monuments, landscape and garden-garden art, valuable urban planning and natural environment. Evaluation of projects implemented in 2010-2018, own design experience in the historical territories of Moscow confirmed that many of the project's shortcomings are due to the lack of special regulatory and methodological documents for design.

The current GOST regulates the composition and content of works for the preservation and facilitation of the modern use of cultural heritage sites that are works of landscape and landscape art. For ordinary objects of improvement in the centers of historical cities located in protective and protective zones, in the united protective zones, a design technique is necessary taking into account the status and features of such territories according to the current legislation.

According to the experience of designing in Moscow, most of the projects of comprehensive landscaping are areas that do not have the status of cultural heritage sites, and ordinary public spaces, landscaped and near-house areas of 0.5–2.5 hectares, located within the boundaries of protected, protected areas, including the united security zone of the historical part of Moscow established within the boundaries of the Kamer-Kollezhsky Val. Often, small parks, squares, boulevards in various functional areas, small public spaces adjacent to subway exits are being developed.

For a comprehensive improvement and greening of the city center of historic cities, a systematic approach is important – not only the preservation of cultural heritage sites, valuable urban planning, landscape and natural environment based on the status and mode of use of territories established in accordance with Federal Law No. 73-FZ «Heritage (historical and cultural monuments) of the peoples of the Russian Federation». Within the boundaries of cultural heritage sites, there should be a «conservation» mode, in protected areas and in protected zones, a «security preservation» regime of cultural heritage sites.

The prospects for the use of integrated improvement and landscaping as a special type of urban planning activity and means providing a socially and environmentally oriented solution of the issues of regeneration of the centers of historic cities are considered.

Keywords: comprehensive improvement and gardening, features of the centers of historic cities, conservation, preservation, architectural monuments, a valuable urban environment, historical landscapes, methodology, design methodology.

V. Z. ABDRAKHIMOV

WASTE RECYCLING ENERGY AND NON-FERROUS METALS IN THE PRODUCTION OF CERAMIC BRICKS CONTRIBUTES TO THE ECOLOGICAL SAFETY OF THE BIOSPHERE

Environmental security is currently one of the main components of the national security of the Russian Federation and includes not only control over the state of the environment, but also the implementation of measures to prevent the occurrence of environmental crises and disasters. The reduction of reserves of traditional natural raw materials makes us look for new ways to replace it with different types of waste. The experience of advanced foreign countries has shown the technical feasibility of this area and the use of more as a tool to protect the environment from pollution. However, almost all basic building materials can be made from waste or from waste in combination with natural raw materials. Due to the involvement of multi-tonnage waste in the production of ceramic materials of mass consumption, which include ceramic bricks, it is possible to radically change the parameters of the raw material base of Russia, which also helps to reduce environmental tensions in the regions. Production of ceramic bricks □ one of the most material-intensive sectors of the economy, so the rational use of fuel, raw materials and other material resources is a decisive factor in its successful development in the context of economic reform. In this regard, the use of waste in ceramic materials is of particular relevance.

On the basis of beidellite clay, waste: energy — ash and slag material and non-ferrous metallurgy — sludge Nickel-skeletal catalyst obtained ceramic brick with high physical and mechanical properties. Innovative proposals for the use of waste from the production of mineral wool in the production of wall materials – ceramic bricks based on fusible clay, the novelty of which is confirmed by a patent of the Russian Federation.

Keywords: ceramic brick, beidellite fusible clay, ash-slag material, sludge of Nickel-skeletal catalyst.

O. Y. LEPTIUKHOVA, M. A. UTKINA

METHODS OF ASSESSMENT THE LEVEL OF ENVIRONMENTAL AND ECONOMIC EFFECT DUE TO THE USING OF LOW-SPEED INDIVIDUAL VEHICLES, BY THE EXAMPLE OF THE TOWN OF SERPUKHOV

For more than half a century bicycle transport demonstrates its effectiveness as one of the elements of the transport network of the city. Currently, vehicles with low-power motors such as electric bicycle, electric scooter, gyrometer, segway, wheelbarrow, scooter motor and others are gaining people's attention. These vehicles can be combined into a group of low-speed individual vehicles (hereinafter - NITS) with similar requirements for the operational parameters of urban infrastructure. From the urban point of view, the interest in NITC is that the number of its users has increased significantly in recent years. The article presents the results of a sociological survey of residents of Serpukhov, allowing to assess the current and potential readiness of the population to use NITC. The growing popularity of NITC has led to an increase in the environmental and economic effect, which is manifested at a particular level of development of the movement on NITC. The ecological and economic effect of the use of NITC has an extremely positive impact on the improvement of the urban environment. This article provides a list of indicators that reflect the growth in the standards of living of society from movement by the NITC, and the calculation of one of them - the increase in entrepreneurial activity on the streets with increased traffic to the NITC. Indicators are necessary for calculation of complex criterion of efficiency and safety of street network due to development of the movement by NITC. The result will allow public authorities authorized to make decisions on the strategy of transport policy of cities to quantify the ratio of economic benefits from the development of infrastructure of the NITC with the cost of its construction and operation.

Keywords: bicycle, bicycle transport infrastructure, scooter, segway, electric bike, electric scooter, cycling, performance indicators, entrepreneurial activity, street and road network, transport.

O.V. PILIPENKO, A.V. ABRAMOV, E.A. SKOBELEVA, O.A. PCHELENOK

DEVELOPMENT OF RESEARCH METHODS OF URBAN SOIL TEMPERATURE DYNAMICS

The article shows that the temperature of urban soils is one of the main indicators of their condition. The average value and the nature of the temperature distribution in the soil volume determine the processes of heat transfer between the soil and the air in the urbanized area. This ultimately characterizes the influence of urban soils on the processes of climate formation in urban areas.

The analysis of modern methods for studying the temperature dynamics of urban soils is carried out. It was found that research is rational to carry out by combining theoretical and experimental methods. The distribution of temperature fields and heat flux density fields in urban soils under various conditions is determined by mathematical, in particular, numerical methods. Coefficients of thermophysical properties of the soil, as well as verification of some calculated results, are carried out by experimental methods. An analysis of existing experimental research methods revealed a key drawback: a small number of points for simultaneous temperature measurement in the urban soils volume. A scheme is proposed, as well as a prototype of a means of automated control of the distribution of the temperature field, which allows us to study the temperature dynamics at various depths of the soil profile.

To test the means of automated control, comparative studies of the dynamics of the temperature field in the volume of urban soil represented by gray forest soil were carried out. An experimental temperature distribution was obtained over several days; a statistical verification of the results was carried out. Theoretical calculations of the dynamics of the temperature field by the numerical model J.A. Infante Sedano It is established that the discrepancies between the theoretically predicted and the experimentally estimated temperature field are insignificant, which allows us to use the developed tool for automated control of the temperature field distribution in the soil to assess its actual state when solving numerous fundamental and applied problems.

Keywords: urban soil, soil temperature, temperature field, automated control tool, soil profile, numerical model

M.A. SLEPNEV, E.I. FILYAKOVA

ESTIMATION OF RECREATIONAL LOAD OF ORYOL CITY URBAN PARK «KUL'TURY I OTDYKHA»

The article considers the impact of recreational load on the natural-anthropogenic region — Central park «Kul'tury I Otdykha» in the city of Oryol. To ensure the sustainable development of natural areas, the ability of components of the environment to heal itself in the conditions of anthropogenic impact is of particular importance. Most of the anthropogenic load in a large city is the recreational load, which significantly affects the natural frame of urban areas. Recreational load causes a significant degradation of the natural complex of the city, and its value is determined by the planning structure of urban development, which determines the distribution of population density and transport accessibility of recreation facilities. Calculated data revealed the recreational load from the planning structure of the residential area located within walking distance from the coastal recreational zone. Ensuring the safety of urban parks, it is necessary to work with complete and reliable information that can only be obtained through regular monitoring studies. The spatial organization of coastal recreational zones should meet the objectives of maintaining and improving the ecological balance of recreational areas, as well as the formation of a comfortable architectural and planning structure of recreational zones and the selection of the most significant recreational formations based on the ecological and recreational capabilities of natural areas and the needs of the population. In this regard, it is necessary to develop functional zoning of natural-anthropogenic regions to regulate the level of recreational impact, and ensure the sustainability of ecological systems of the city. To monitor the level of anthropogenic impacts, the definition is used — the ecological capacity, which is determined by the limiting values of anthropogenic loads determined on the basis of field observations.

Keywords: Anthropogenic load, functional transformation, natural frame of the city, recreational area, coastal area, number of potential visitors.